

## **TIMEPIECE EQUIPPED WITH A DEVICE FOR DISPLAYING TWO TIME ZONES**

5 The present invention relates to a timepiece equipped  
with a device for displaying two different time zones.

10 A certain number of devices for displaying several time  
zones exist. The disadvantage with most of the proposed  
devices lies in the difficulty there is in reading  
these devices. The usefulness of such devices is that  
they make it possible quickly to know the standard time  
in another time zone. Given that, in most cases, the  
time difference corresponds to whole hours, adding  
hours as you go east and subtracting hours as you go  
15 west, simply indicating the hour makes reading clearer,  
the minutes being the same in both time zones. It is  
also important that, when changing time zone, this  
change can be made simply and will always give a clear  
indication.

20 US 2 674 085 has already proposed a timepiece  
comprising two hour hands one of which is associated  
with an indexing device having twelve positions each  
one corresponding to an hour and the angular position  
25 of which can be altered in whole steps according to the  
time difference between two time zones that are to be  
displayed simultaneously. Such a method of display  
using just one dial is not easy to read.

30 US 3 277 646 proposes a collection of a plurality of  
watch movements, five in the example described, each of  
which comprises a display unit for displaying the hour,  
each display unit being associated with a rewinding and  
time-setting stem. Combining five mechanical watch  
35 movements into one single wristwatch housing is a  
somewhat ambitious prospect!

The object of the present invention is to meet these requirements as best possible, using a mechanism that is simple and easy to use and to read.

- 5 To this end, the subject of the present invention is a timepiece equipped with a device for displaying two time zones as claimed in claim 1.

Advantageously, the means for indicating the hours in  
10 the two time zones are associated with step-by-step drive mechanisms. By virtue of this display mode, reading is easy, the hours indicators indicating only the whole hours in successive jumps from one hour to the next, while the minutes indicator indicates only  
15 the minutes common to the two time zones.

As a preference, the display units each comprise a dial and a hand, the axes of rotation of the three hands being aligned with the axis of rotation of the minutes  
20 hand situated between the axes of rotation of the hours hands, the respective edges of the two dials of the units for displaying the two time zones extending within the dial of the unit for displaying the minutes.

- 25 This arrangement in which the hours dials encroach upon the minutes dial brings the hours hands closer to the minutes hand and makes combining the reading of the hour with the reading of the minutes easier to do.

- 30 Other particularities and advantages of the present invention will become apparent from reading the description which follows and which relies upon the attached drawings which illustrate, schematically and by way of example, one embodiment of the timepiece that  
35 is the subject of the present invention.

Figure 1 is a plan view of the display of the timepiece;

Figure 2 is an actual plan view of this display mechanism;

Figure 3 is a plan view of the display mechanism  
5 showing this mechanism and its hidden detail;

Figure 4 is a view in section on IV-IV of figure 3;

Figure 5 is a view in section on V-V of figure 3.

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The display device illustrated in figure 1 has three separate display units, a unit for displaying the minutes 1, and two units for displaying the hours 2, 3. Each of these display units comprises a graduation 4,  
15 5, 6 of 60 minutes in the case for the minutes-display unit 1, and of 12 hours for each of the hours-display units 2, 3. An indicator hand 7, 8, 9 is mounted to pivot at the center of each of the graduations 4, 5, 6. The hand 8 is a minutes hand and is therefore driven at  
20 one revolution per hour and the other two hands 7, 9 are hour hands moving past 12-hour graduations and therefore each make two revolutions per day.

Each hours display unit 2, 3 preferably also comprises  
25 a window 10, 11 to allow distinction to be made between the hours of the day and the hours of the night as will be explained hereinafter.

The drive mechanism that drives this display device is  
30 illustrated in particular in figures 3-5 and comprises a cannon pinion 12 friction mounted on the axle of the center wheel (not depicted) of the timepiece finishing geartrain like in all mechanical watches.

35 A false cannon pinion 13 is mounted, free to rotate, on the cannon pinion 12 of the minutes geartrain and is connected to it by a one-way drive device comprising an annulus 14 secured to the cannon pinion 12, on which annulus a pawl 15 is pivoted and is pressed into

ratchet teeth 16 secured to the false cannon pinion 13 by a spring 17.

The false cannon pinion 13 meshes with an intermediate gear 18 which in turn meshes with a wheel 19 secured to a toothed sector 20. The path described by it as it rotates in the clockwise direction intersects the path of a toothed sector 21a secured to a lever 21 pivoted about a spindle 22. This lever bears a pawl 23 pressed in the clockwise direction by a return spring 39. The angular travel of this pawl 23 brought about by the return spring 39 is limited by a pin 23a engaged in an opening 21b of the lever 21. The path of this pawl 23 intersects that of a 12-toothed star wheel 24 positioned by a jumper spring 25. This star wheel 24 is secured to the hours hand 7 of the hours display unit 2. It is also secured to a pinion 26 which meshes with an intermediate gear 27 which in turn meshes with a wheel 28 secured to a day/night disk 29 (figure 2) that can be seen through the window 10 of the display device (figure 1). The toothed ratio between the pinion 26 and the wheel 28 is  $1/2$  which means that the day/night disk makes one revolution when the star wheel 24 makes two. The 12-toothed star wheel 24 makes one revolution in 12 hours, which means that the day/night disk makes one revolution in 24 hours.

The lever 21 also bears a second toothed sector 21c which meshes with a free pinion 30, secured to one of the ends of a spiral return spring 31. The toothed sector 32c of a second lever 32, arranged symmetrically with the lever 21 with respect to the free pinion 30, meshes with the latter to drive a second star wheel 33 secured to the other hour hand 9 via a pawl 38 associated with a return spring 40. Like the star wheel 24, this star wheel 33 is associated with a jumper spring 46 which allows it to advance step by step and is secured to a pinion 34 for driving a wheel 35 secured to a day/night disk 36 (figure 2) that can be

seen through the window 11 of the display device (figure 1).

5 An eccentric stop 37 collaborates with the lever 32 to limit its travel. Given the desmodromic link between this lever 32 and the lever 21 via the free pinion 30, this stop 37 also serves to limit the travel of the lever 21, when the toothed sector 21a releases these levers 21 and 32 to the force of the return spring 31,  
10 each hour.

Figure 2 illustrates the moment at which the toothed sector 20, which rotates in the clockwise direction of the watch, comes into mesh with the toothed sector 21a of the lever 21 to set the spiral spring 31 intended to  
15 return the levers 21, 32 to the position illustrated in figure 2. As they move, the levers 21, 32 drive their two respective pawls 23, 38 in the clockwise direction. During this movement, these pawls 23, 38 pivot in the  
20 counterclockwise direction when they encounter the teeth of the respective star wheels 24, 33. They are then returned to the rest position illustrated by their respective return springs 39, 40 so that they drive the respective star wheels 24, 33 by one step when the  
25 levers 21, 32 are returned by the spiral spring 31 to the position illustrated in figure 2.

The star wheel 33 can also be driven manually to adjust the position of the hours hand 9 with respect to the  
30 hours hand 7 according to the time zone that is to be displayed. For this, a lever 41, equipped with a pawl 42 similar to the pawls 23, 38 of the levers 21, 32 and returned by a spring 43, is pressed against a stop 44 by a return spring 45. This lever 41 has an arm 41a  
35 intended to mesh with an actuating push rod (not depicted) passing through the watchcase to allow the user to display the desired time zone.